Minutes
Oct. 3, 2025
Remote

Attendees:

WAC Members: **Kannan Vembu** (Chair), **Dan Winograd** (Vice Chair)**, Adriana Cillo** (BWSC)**,** Craig Allen, **Wayne Chouinard** (Belmont), George Atallah, **Dr. Karen Lachmayr, Martin Pillsbury** (MAPC), **Taber Keally** (NepRWA), **Alfredo Vargas** (Newton), **Christine Bennett (**Advisory Board), **Jonathan Smith** (Somerville), **Felina Silver** (LWV), **Zhenyu Tian** (Northeastern). **(**Members in attendance in **bold**).

Guests: Moussa Siri (WSCAC), David Duest, Denise Ellis-Hibbett, Lisa Wong, David Ruiz, John Vladkowski, Katherine White-Keating (MWRA) Kendall Christiansen (Gaia Strategies), C

Staff: Andreae Downs

VOTES: June Minutes

Chair's update: Kannan Vembu the Boston Globe ran a misleading article on the cleanliness of Boston's beaches, and WAC wrote a letter to the editor clarifying that. The Advisory Board ran a very educational and informative tour of CSOs on the Charles, and I thank them for letting WAC members attend. Finally, there are several bills on Beacon Hill to ban land application of residuals because of PFAS contamination, and WAC wrote letter to the chairs of the Joint Committing on Agriculture as well as to seven representatives and three senators—all sponsors of these bills. Andreae has already had discussions with Rep. Owens and Rep. Garballey on this. The reception has been pretty good. I just want to say thank you to Andreae for your diligence. My signature goes on the letters, but all the work of writing and being on top of that is Andreae's.

Director's Report: Andreae Downs: Thanks—Representatives Garballey and Owens are allies on the wipes bill, but clearly are scared by the PFAS issue. I just pointed out that banning land application just transfers the cost of PFAS pollution to ratepayers and utilities, and that landfilling and incineration are just as problematic in terms of PFAS pollution in the air and water. Plus, you add trucking costs and additional climate gas emissions. And I stressed that the most effective way to combat PFAS pollution is in limiting their production and use. I think this

will be a continuing discussion this fall, but the focus for WAC this fall will be on the Combined Sewer (CSO) Long Term Control Plan (LCTP) draft due out in December.

MWRA staff outline five tools that can be used to control overflows—they have ruled out on-site treatment because of the amount of chemical trucking needed. The remaining tools are

- Sewer separation
- Green Infrastructure
- Conveyance
- Storage (tanks or regional tunnels)

They also outlined key considerations and key challenges. The MWRA Board clearly felt it needed more information and discussion. I believe they are planning a special October meeting about CSOs. I will be looing to attend any public meeting on that. It is also the topic of the October Advisory Board meeting, and of our joint meeting with them in November.

Politically, there is an organized but fairly uninformed effort to stop all CSO from entering the Charles, Mystic, and Alewife. While it's important to continue to reduce CSO, full sewer separation would cost $5 billion, take 50 years, and be very disruptive to the neighborhoods. It would also not remove phosphorus. And for that level of funding, you have to ask what the water quality impacts would be. Given that fecal bacteria concentrations are highest in the Charles and Mystic upstream of the CSOs, WAC has suggested that stormwater clean up and I/I reductions(inflow and infiltration) would move the needle on getting the rivers to a regularly boatable and swimmable condition. And WAC will continue to raise those issues.

Advisory Board: Christine Bennett: The MWRA Board's special CSO meeting will be the 29th of October. The Advisory Board has moved its October meeting to the 30th. Notes that the Advisory Board sends out "News & Notes" via email. They have also created a CSO resource page on their website. (Blog post here.)

AB just sent out supplementary questions to communities, such as whether they have an enterprise fund, how much of a burden utility assessments may be, and whether they have irrigation meters.

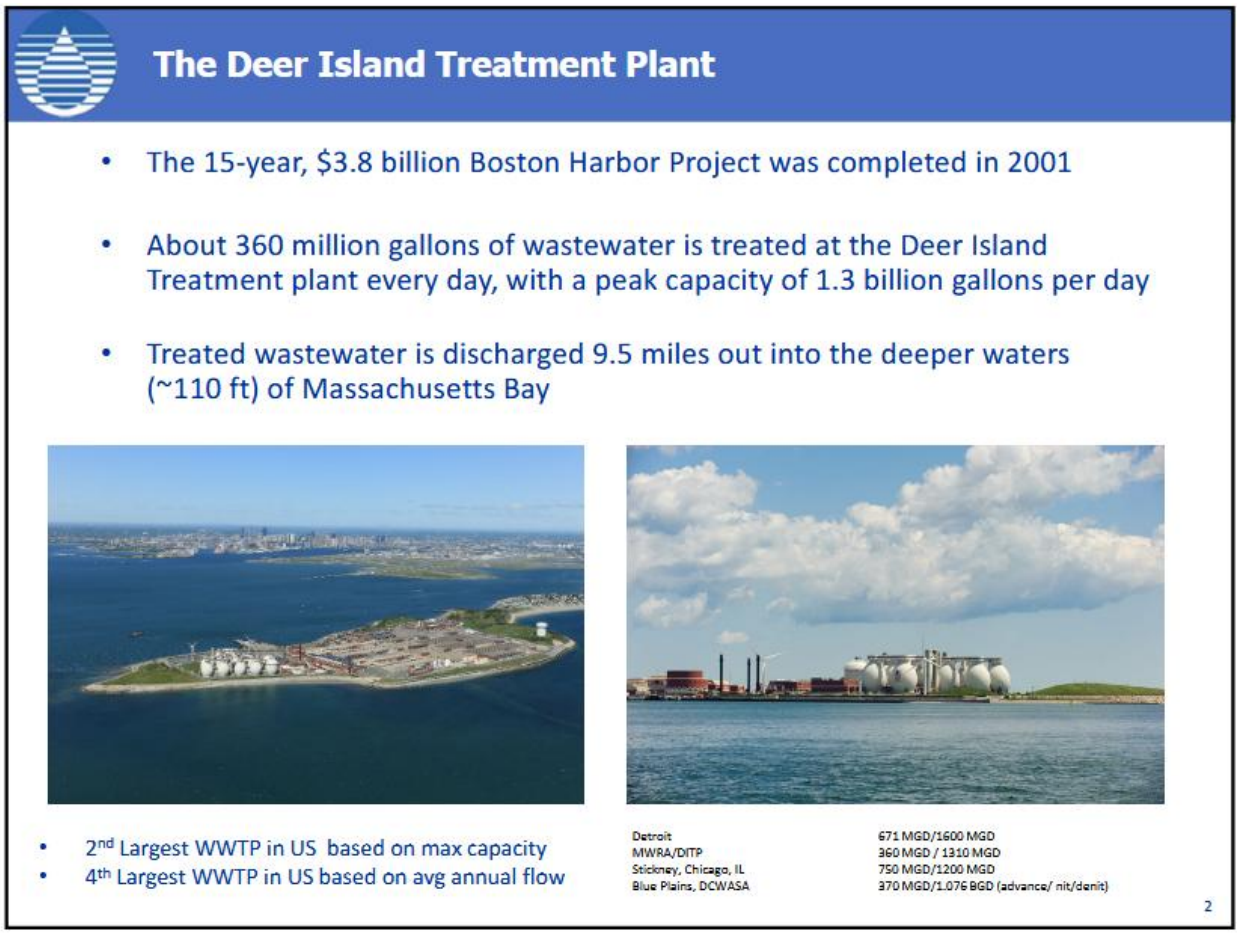
AB is forming a working group on long term rates management. Particularly important with an ageing DI treatment plant, a new water tunnel and possibly expensive CSO work.

WSCAC Update—Moussa Siri: Despite the drought, Quabbin is at 84.3% full. The streams flowing in, however, are dry. He is also still working on membership. Invites WAC members to join.

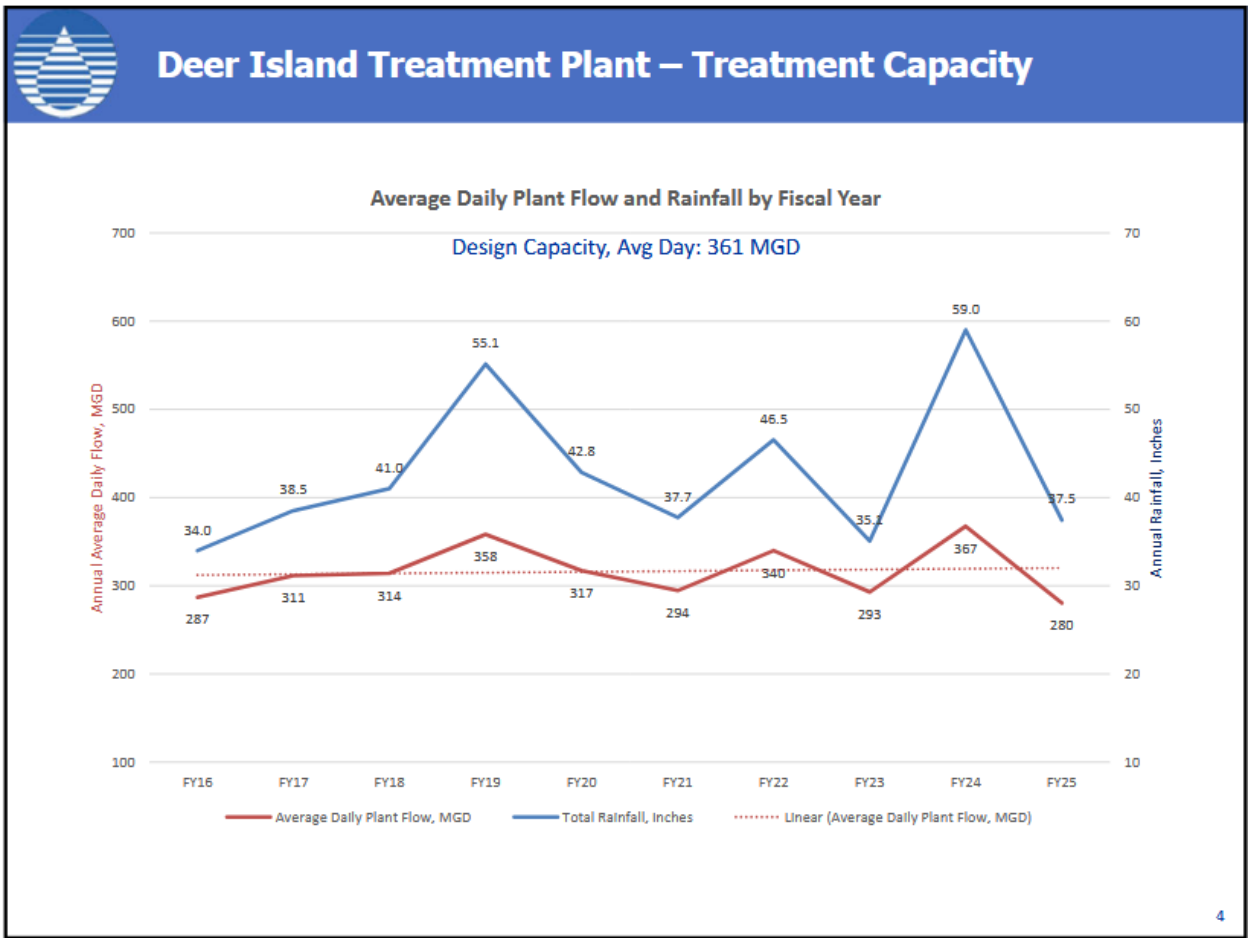
PRESENTATION: David Duest, director of Deer Island.

Andreae: The idea for the meeting came after some questions arose in public CSO meetings. Could more water be sent to Deer Island? (this is not a current option on the table). Could stored CSO be treated at Deer Island? Is there space for more clarifiers? Where would the new Combined Heat & Power plant go if more clarifiers were added? And what's the latest on PFAS and residuals?

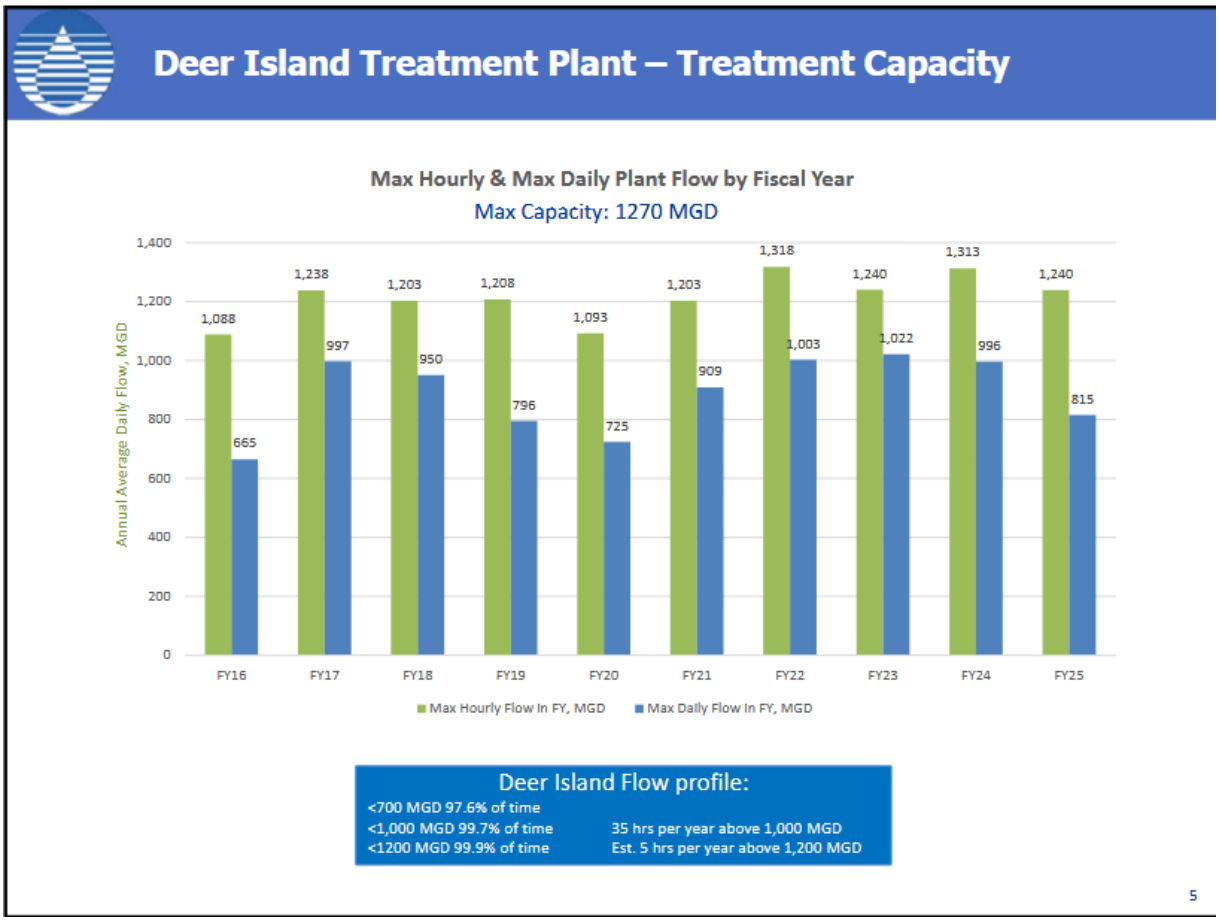
Dave: Been with MWRA 35 years, so he experienced the old treatment plant as well as the improved one now on site.



Minimum dilution is 70x, which helps. This plant gets 95% removal of pollutants.

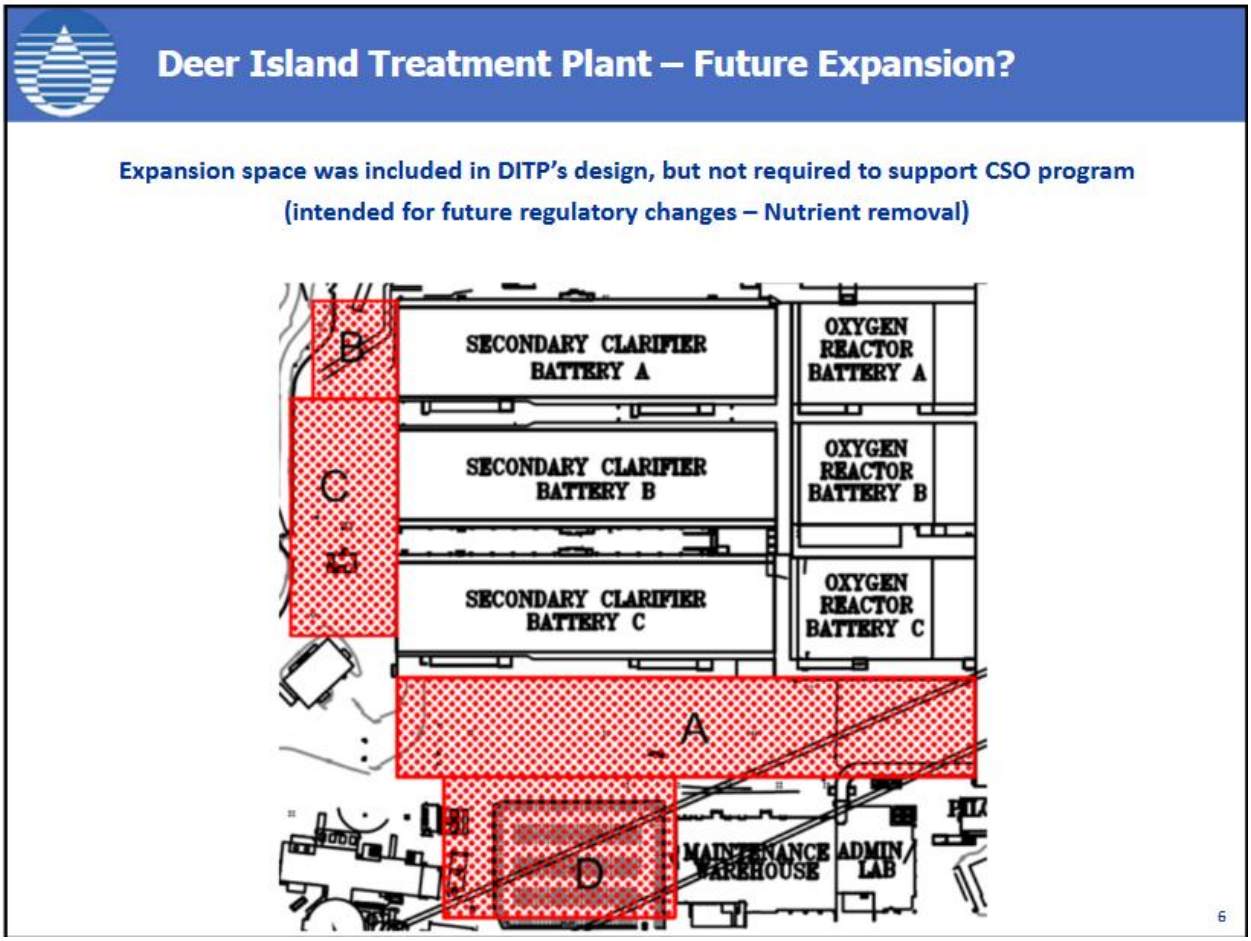


Capacity: Deer Island is designed for a max flow of 361 mgd. Over the last 10 years, we exceeded that only in fiscal 2024, which ended June of 24; Fiscal 25, which ended this June, was the lowest flow year for average daily flow over the course of the year since the startup of the plant at 280mgd.



As far as maximum capacity—and this gets into CSO and wet weather flows, as you can see, we often get to maximum capacity based on hourly flows. But the important thing to note is the green bar. During individual storms, we will reach max capacity. Some key points in the blue box under the chart is that flows are less than 700mgd 97.6% of the time. That's the flow limit for the secondary treatment process at Deer Island. Any flows above that limit are typically "blended." They get primary treatment, but some will not get secondary treatment. That does not absolve us of meeting our permit requirements, but we have met those for the last 18 years.

But since Deer Island does hit maximum capacity during storms regularly, diverting additional combined flows to the plant would not be advisable from an environmental perspective, because that will cause backups in the sewer systems upstream.



Deer Island does have room to expand in the original design. But this was intended for nutrient removal if needed in the future (nitrogen)—not to support the CSO program. We can't really bring additional flow to the plant during high-flow conditions because of the capacity of the tunnels into Deer Island. We do have capacity to treat if flows are put into a storage tank or tunnel and pumped to the island when flows come back to normal.

The space labeled "A" in the slide was originally planned as clarifier battery D. But we found that Deer Island can meet all the NPDES requirements with three secondary batteries. So this allows for future nutrient removal space, but it also saved well over $500 million in construction.

The areas labeled B and C would give clarifiers A, B and C more settling capacity in the case Deer Island needs to add nutrient removal.

Questions:

So the additional capacity would be for adding tertiary treatment?

A: Yes. MWRA was required to do a nutrient technology survey in its 2000 NPDES permit, and see what technology would fit into this space.

Any consideration of adding oxidation or other treatments?

A: we've looked at several alternative technologies. One of the simplest would be to increase the sludge recycle flow. Right now we only recycle about 30% of the flow from the secondary clarifiers back to the head of the oxygen reactors. We could increase that to 80% and get a lot more nitrogen and phosphorus uptake. And we could do that without taking up more space.

There's some research on how to destroy PFAS, and oxidation looks promising (in effluent), so oxidation might be a side benefit of adding that stage.

Q: The expansion of the clarifiers would not allow for more flow all at once; you would have to expand the pipes feeding the plant?

A: Yes, and we are talking about deep rock tunnels that are 11-12' in diameter and some from the 1890s.

So not practical or cost effective.

In the September Orange Notebook (Key Indicators of MWRA Performance, a quarterly update for the MWRA Board) that the quarterly plant flow was 11% higher than the 4-year average. And you got an instantaneous peak flow of 1,239 million gallons.

A: Yes. That was only the fourth quarter. It was otherwise a dry year. Weather patterns have changed significantly, and we are seeing less frequent rains, but more intensity.

Q: When you talk about nutrient removal, are you strictly talking about nitrogen and phosphorus?

A: Yes, principally nitrogen, but we aren't required to do that and we're showing no measurable impacts of nitrogen and phosphorus from our discharge. In fact, I think we could more than double the nitrogen in our discharges without having any measurable impacts on the receiving waters.

Q: And there are new technologies, so if it comes to that, MWRA may want to reexamine how to do nutrient removal.

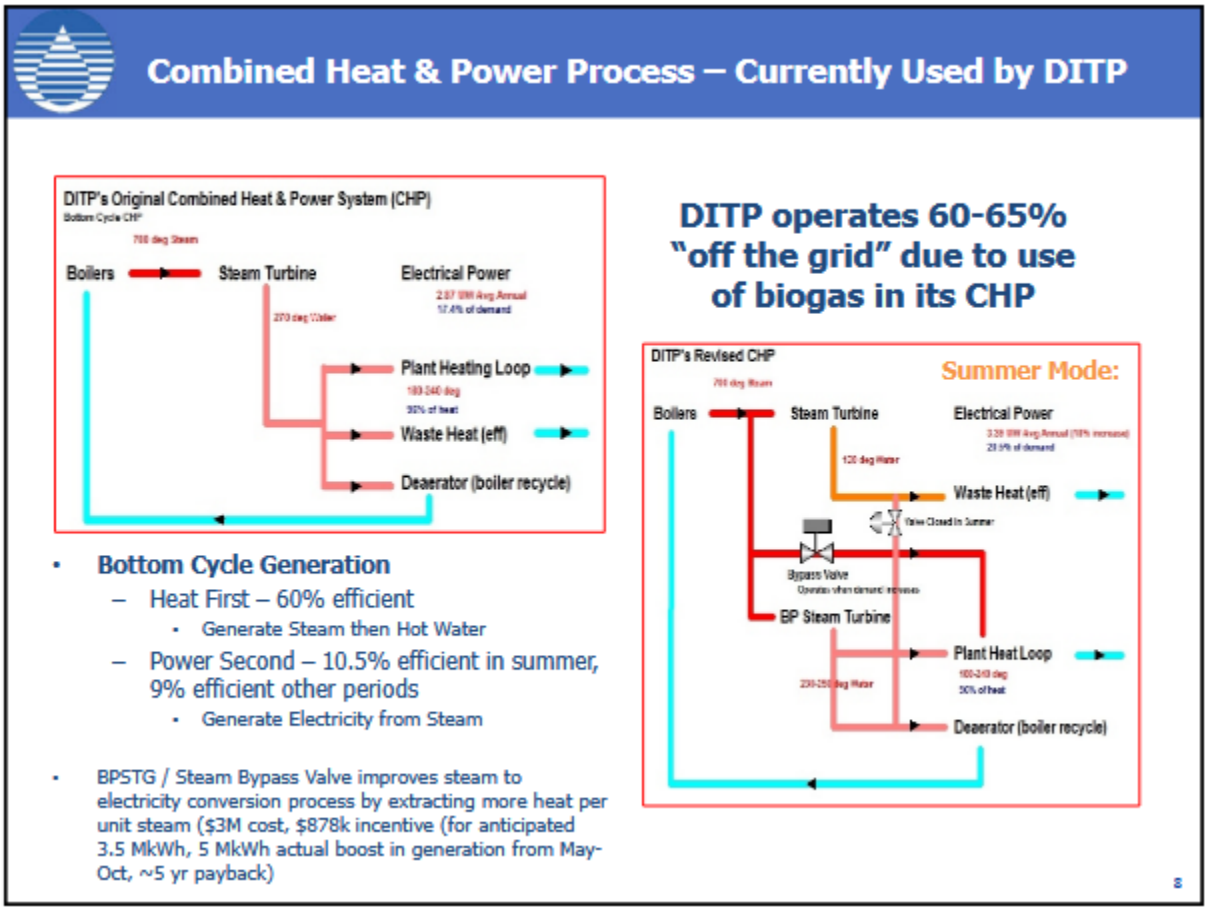
A: and EPA over time always tries to improve discharge quality. But they haven't put as much pressure on ocean dischargers for nutrient removal. There's more pressure on rivers and streams that could potentially affect drinking water. That's why our Clinton wastewater treatment plan has to do full nutrient removal, including nitrogen and phosphorus, and have very strict limits.

Q: what technologies would you use for that?

A: We are looking at options—into the future. Side stream treatment is an effective option: we can remove 20-30% of nitrogen and phosphorus by treating the recycle streams from the pelletizing plant.

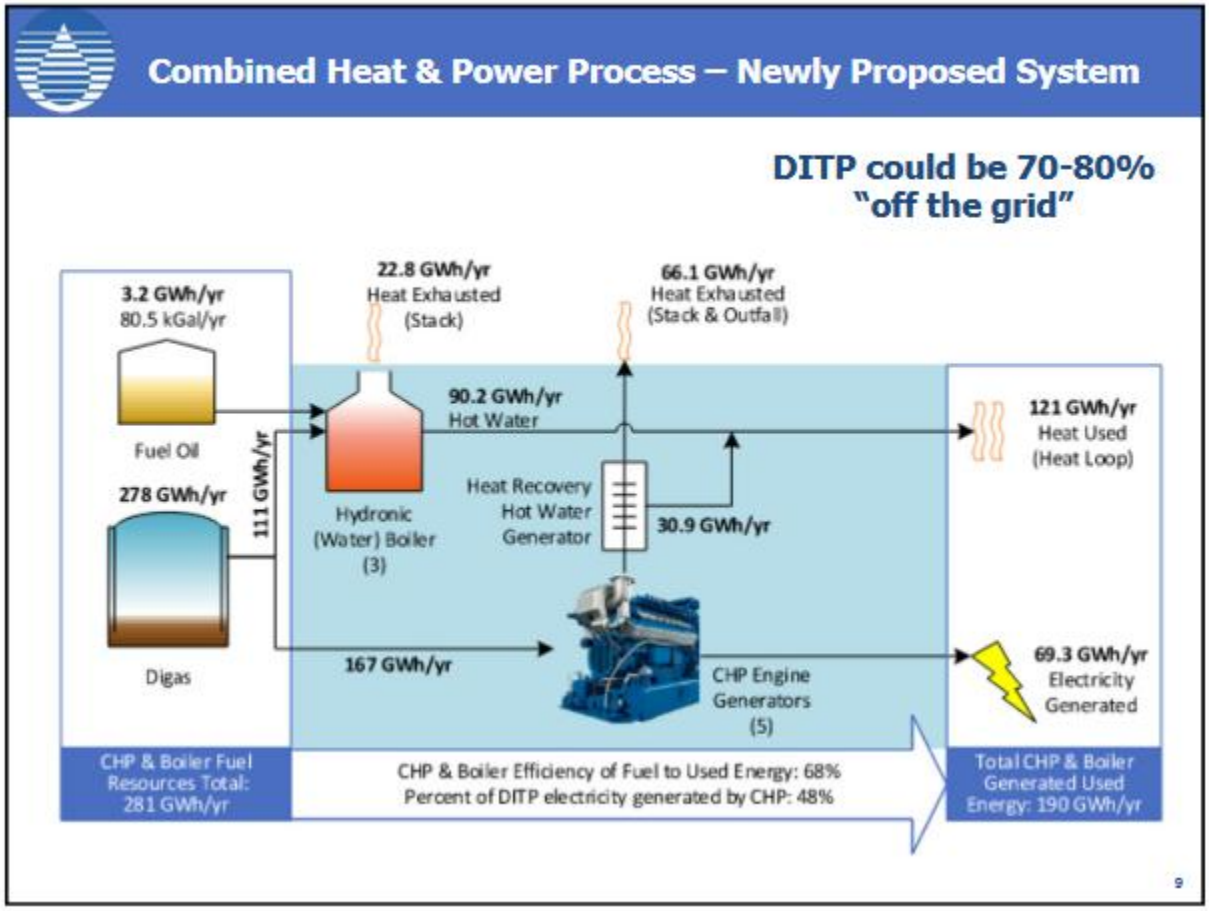
Combined Heat & Power Project

To refresh WAC members' memories:



Currently, the digesters produce biogas, which we take and feed to high-pressure steam boilers, send the steam through a turbine to generate electricity, and send the hot water to the digesters and roughly 53 buildings for heating. That system was designed 35 years ago because we had no natural gas coming to Deer Island and needed to provide heat for the facility.
We have an electrical cable coming under the harbor from South Boston, so electricity wasn't as critical. We are meeting greater than 95% of the heat needs of the plant through this process, but only about 22% of the electricity needs of the plant. From a heat perspective, we are about 80% efficient, which is good, but on the electricity side we're only about 9% efficient during the winter months. We do improve the process by adding a pack pressure turbine to extract more heat from the system during the summer, but that only increases our efficiency to about 10.5%.

Overall, we are about 60-65% off the grid as a result of this combined heat and power process, which is impressive for a plant this size. In total, the use of digester gas saves MWRA about $26 million a year.

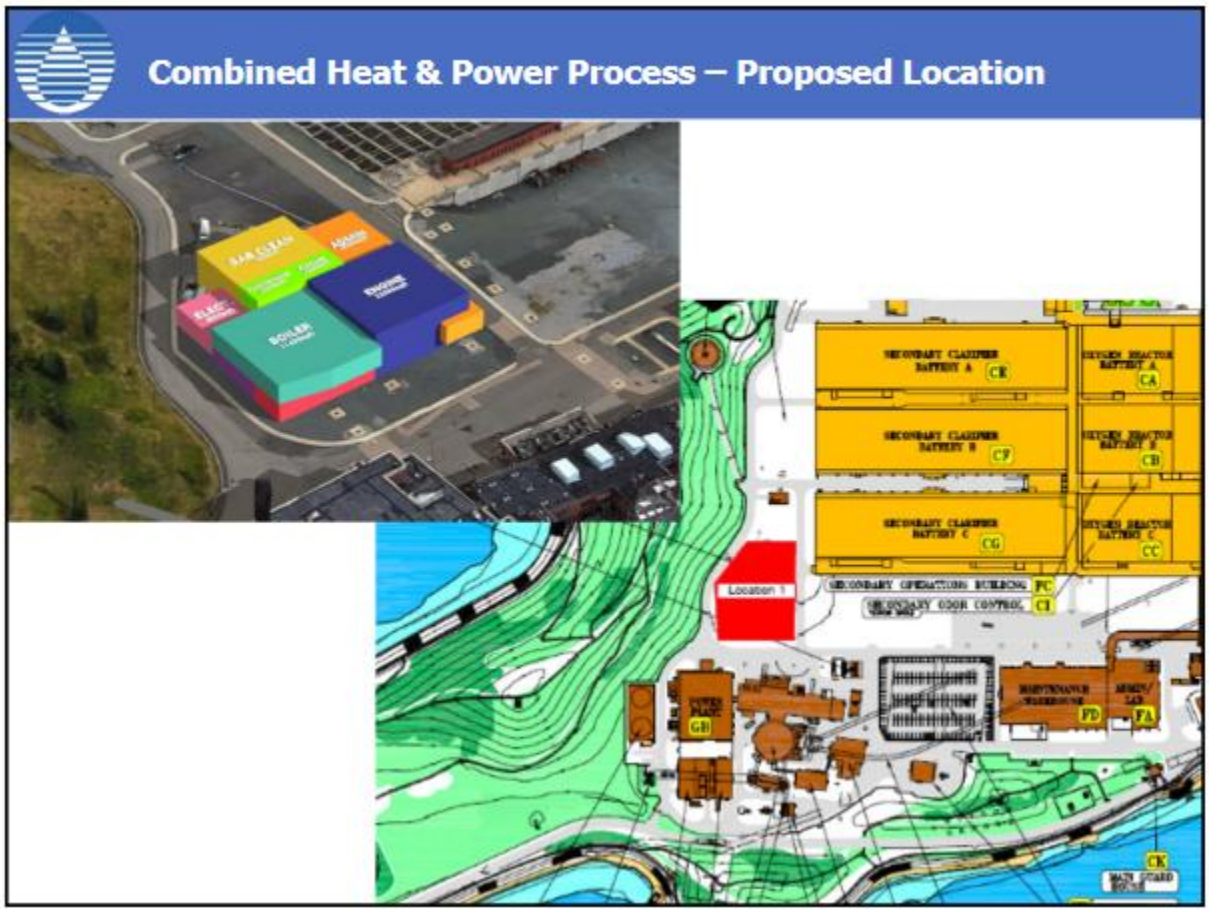


The proposed CHP system eliminates the high-pressure steam boiler and replaces that with hydronic boilers, just to provide heat for the plant, and then we will have internal combustion engines that will more efficiently use the digester gas to generate electricity. This should boost electrical generation to 38-40% efficient. We expect to get between 70-80% off the grid, maybe more.

MWRA is currently in design phase for this. The contractor has modeled the energy and economic benefits we could expect to see. This contract runs 34 months, so we should have a completed design in about 2 years. Construction is estimated to run about $200 million, but a 10-year payback is very possible, especially if we get grants.

The proposed location is at the end of what used to be set aside for secondary battery D or the end of secondary battery C.

The small brown boxes show where the current heat loop is located, which MWRA doesn't want to relocate.



Construction starts after the 2-year design process is complete, and construction is expected to take another 3-5 years, probably starting in 2028. Want to get it right, and build in extra space in case we need to expand for nutrient removal or additional sludge.

Q: The $200 million budget does that include the impacts of tariffs?

A: Hoping to source all the equipment in the US.

Also—in the summer months, there is the possibility that we could go entirely off the grid

Q: or exporting energy?

A: potentially, yes.

Q: A number of years ago, WAC and MWRA explored the possibility of co-digestion (of food waste). New members may not be aware of this, and why it was eventually ruled out.

A: Yes. We issued a contract with Waste Management to explore co-digestion using ground shipping to Deer Island. We would then verify the proof of concept. Food waste is not MWRA's core mission, but if it's profitable, why not do it? The problem was that when the Town of Winthrop heard about possible increased truck traffic coming through, they were not happy. During the initial phase we were talking 3 trucks a day, increasing to 9 and potentially 27 trucks a day.

Once we had proved the concept, the plan was to barge the material to Deer Island. But we lost the trucking route, and when we evaluated barging the material to Deer Island for the pilot, it was such a huge outlay of costs that we decided against that program.

So we shared our information with Greater Lawrence (Sewage District), and they built it out. Now all of the pre-processed food waste is going there—and they are off the grid as a result.

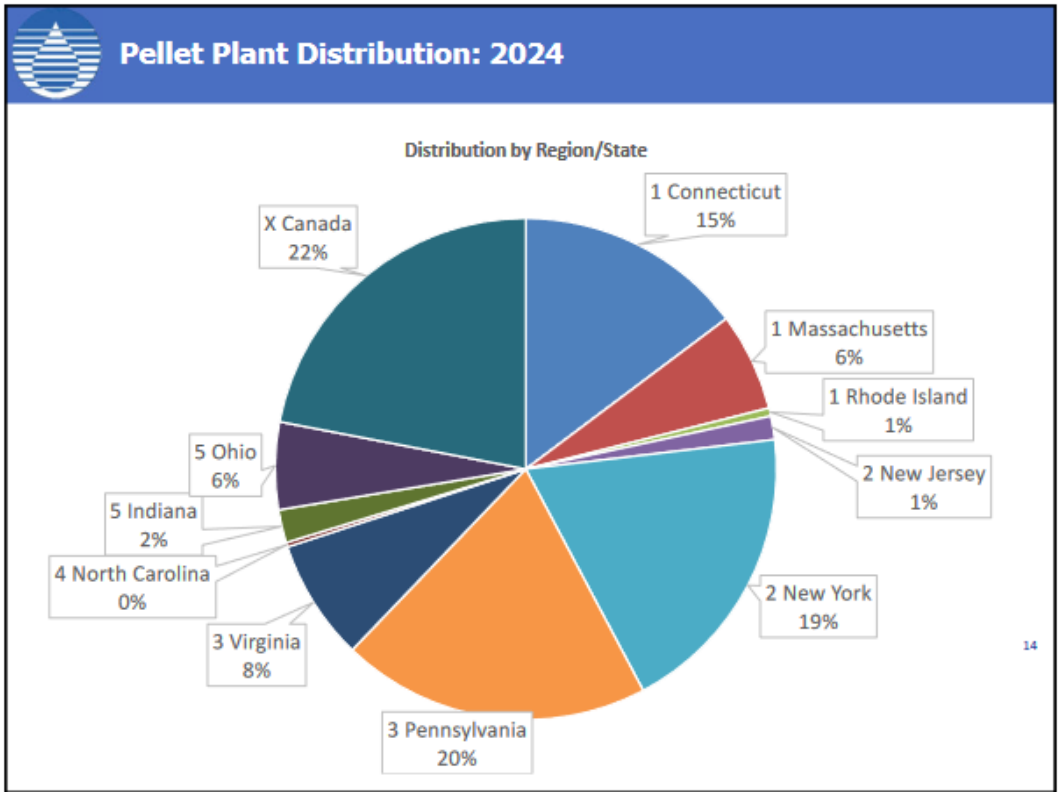
Andreae: We toured that plant a few years after startup. To be clear, they are taking commercial food waste, not residential.

Residuals Program Update

The pellet plant is located in Quincy, MA—the decision to move off Deer Island is trucking through the narrow streets of Winthrop, again. By having this final step across the bay, trucking is easier. The plant is located near a rail yard and highways. It was designed, constructed and owned by MWRA. Contracted out--current annual budget is $21 million, for roughly 105 dry tons/day. We also have a $6 million contingency in case we have to switch to landfilling.

Primary goal of the contract is beneficial re-use, but there are provisions that at any time we can switch to landfilling. If we had to switch to landfill only, it would be another $2.6m annually (no marketing and distribution of fertilizer pellets). Contract from 2024-33. Produces the highest-quality fertilizer by EPA and DEP standards.

Minimum product is 95 tons/day, but we've never dropped below that. The contractor is required to market and distribute all of the final product year-round. They can store it if it would sell better in another season (like summer).



Here's the distribution. NE states received about 22% of them. Numbers are the EPA regions. The further out from MA, the higher the cost of disposal, because of the shipping costs. Connecticut, which is at 15% now, just put in regulations outlawing any biosolids with any PFAS. We lost Maine in 2022, I think. And several other states choose not to take the material.

Q: New Hampshire?

A: NH chose not to accept biosolids even before PFAS was known.

PFAS testing has been ongoing since 2019, but only got an approved method to test for PFAS in biosolids in 2024. The good news is that the testing we were doing in 2019 is pretty close to the approved method.

PFAS does threaten beneficial use. There are no Federal limits as of today, and states are starting to step up. The EPA did do a draft risk assessment last, which was a worst-case scenario. It is still a draft, but a lot of states are referring to it as gospel—and it looks at 1 ppb.

Michigan actually has a suggested limit of 25ppb within their state. Anything above that is more restricted or, at 125 ppb, banned from land application. MWRA would meet that 25 ppb standard.

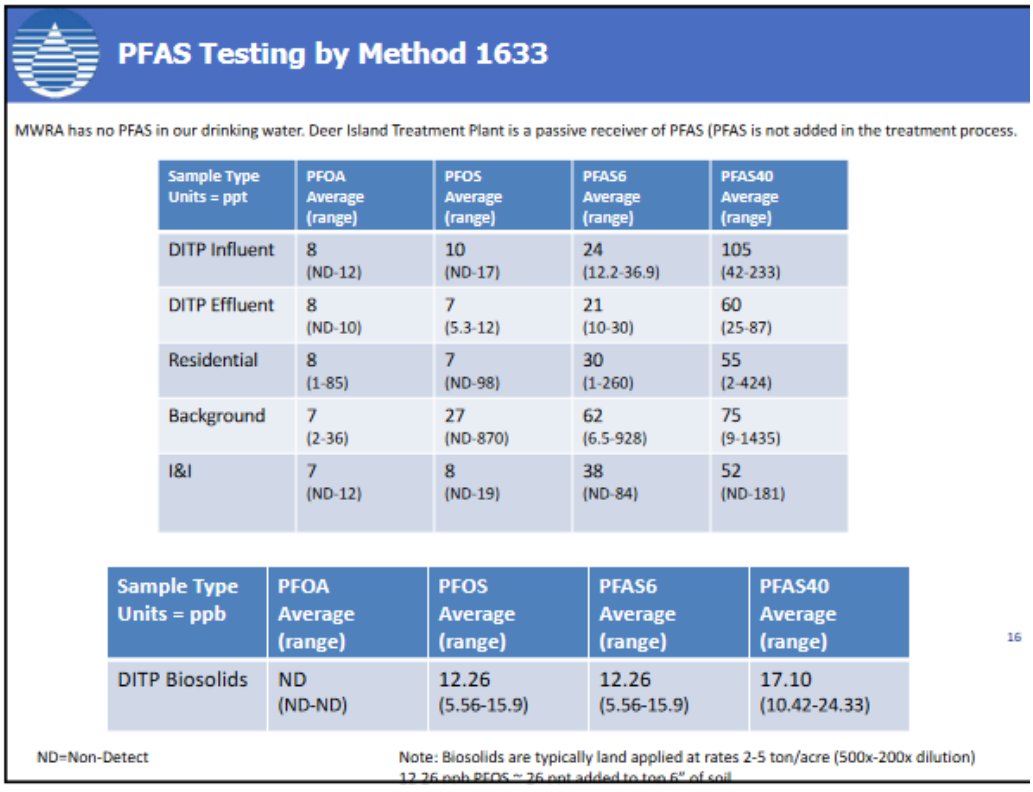
MA is considering banning or limiting land application, which is a concern.

MWRA and most WWTP in the country advocate for source control as the solution. Unfortunately, it's in almost everything. Stain retardants and removals, waterproofing, non-stick pans. Take-out coffee cups, most of your plastics (anything extruded), even toilet paper.

Greater than 98% of human blood in the world has PFAS in it. Been in use since first developed in the 1940s without restrictions. But they are potentially dangerous to human health.

Q: and are there any ways to know if PFAS is in a product?

A: Not really, and new PFAS are invented every day.



PFAS Testing by Method 1633

MWRA has no PFAS in our drinking water. Deer Island Treatment Plant is a passive receiver of PFAS (PFAS is not added in the treatment process.

Sample Type Units = ppt	PFOA Average (range)	PFOS Average (range)	PFAS6 Average (range)	PFAS40 Average (range)
DITP Influent	8 (ND-12)	10 (ND-17)	24 (12.2-36.9)	105 (42-233)
DITP Effluent	8 (ND-10)	7 (5.3-12)	21 (10-30)	60 (25-87)
Residential	8 (1-85)	7 (ND-98)	30 (1-260)	55 (2-424)
Background	7 (2-36)	27 (ND-870)	62 (6.5-928)	75 (9-1435)
I&I	7 (ND-12)	8 (ND-19)	38 (ND-84)	52 (ND-181)

Sample Type Units = ppb	PFOA Average (range)	PFOS Average (range)	PFAS6 Average (range)	PFAS40 Average (range)
DITP Biosolids	ND (ND-ND)	12.26 (5.56-15.9)	12.26 (5.56-15.9)	17.10 (10.42-24.33)

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ND=Non-Detect

Note: Biosolids are typically land applied at rates 2-5 ton/acre (500x-200x dilution)
12.26 ppb PFOS ~ 26 ppt added to top 6" of soil

There is NO PFAS in MWRA drinking water, so Deer Island is a passive receiver. It is probably in everything flushed.

Regulated industrial users are contributing almost the same percentages of PFAS as residential. And we can't set limits for individual toilets or households. We can't get it out of what's coming into the plant without some restrictions on PFAS use in the real world.

Q: Unregulated discharges are not just residence, but also commercial—that is retail, restaurants, right?

Addressing the lower graph, remember the goal of wastewater treatment is to remove contaminants, the biosolids will concentrate the PFAS, which do settle out.

When looking at water and effluent, we measure in parts per trillion. In biosolids, we measure in parts per billion. The good news is the results we are seeing in PFOA are non-detect. That's because it was heavily regulated about a decade ago and is mostly out of production—source control works.

PFOS, while also regulated, is in a lot of legacy products and in products imported from other countries. So that's not going away.

In total, the PFAS 40—we are only seeing about 17ppb, so we are meeting the Michigan standards easily.

We are not telling people to apply 100% biosolids onto land, but to use as a fertilizer based on the nutrient requirements of the soil. The typical application is 2-5 tons per acre, and that gets tilled into the first 6 inches of soil. Just at that application rate, that's 200-500x dilution, so now we are talking about that 13 parts per billion becomes about 26 parts per trillion added to the soil. It's not like we are putting ppb levels in the soil; it's really parts per trillion.

The other thing that gets confused is the drinking water standard of 4 ppt. The levels in biosolids aren't the same—here you are comparing apples and oranges. Same with heavy metals and legacy contaminants—it's also a factor of a thousand difference. And the PFAS is mostly bound up in the biosolids.

Some PFAS do leach out of soils into groundwater, but there's not enough research to determine which ones and the danger they might pose to public health.

Q: I asked NEBRA about background levels of PFAS in New England soils—and outside of New Hampshire, which has highly contaminated spots, but the average is 1 ppb.

Q: Are MWRA pellets shipped 100% by rail?

A: Initially, that was really important, but they've found that shipment by truck is more efficient. Quicker to get to market. For the last 5 years, it's been all trucked. For larger landfills, we might return to it, as when you are shipping large amounts to one location, it is more efficient.

Q: Just a comment—in the second to last slide it says there are no PFAS in MWRA drinking water, which I think is safe to say for the PFAS 40 based on the approved testing method, but is probably not true for all PFAS.

Q: And there are over 5,000 PFAS, for which we don't have a testing method.

Andreae: Exactly. That's why in WAC's comments to DEP and EPA, we said that they need a test for the fluorine-carbon bond that is the basis of all PFAS, rather than chasing an increasing number of variants.

Q: Comment about PFAS in the drinking water system—WSCAC gets lots of reports on this. They aren't detecting PFAS, but concentrations may just be very low—below the levels they can test.

A: So just for perspective, 1 ppb is one second in 32,000 years, or $1.50 out of all the US currency in the world.

Andreae: The PFAS Interagency Task Force had among its presentations an inverted pyramid of risk that could be useful—it showed the large number of consumer products where PFAS may be included, but where it is not needed for those products to function, a number where it is important, but not life-saving, and a few—like perhaps pacemakers or arterial stents—where it is life-saving, and where non-toxic products must be found to replace PFAS before they can be banned in those products. (see the slide in the link on "essential use concept.").

(The Task Force report gestures at this hierarchy (I summarized this report for the committee in 2022, and will send that summary to members) by recommending phasing PFAS out of consumer products with those that children are exposed to high on the priority list.)

And I think one reason Maine had the PFAS issues it had was because the biosolids in question were from paper plants, which use PFAS for water repellent products (cups, etc.) and for water absorption (toilet paper, paper towels, etc.)

Q: Can you summarize the effects the Maine (land application ban) has had on treatment plants there?

A: They have to ship everything out of state, which impacts the cost of disposal. They also added regulations for landfills that make it impossible to landfill any liquid sludges—so they are shipping it to Canada and other states. Their costs have increased between 20% to 300%. If MWRA switches to landfilling, it will double the cost of marketing and disposal of pellets.

Q: All PFAS degrade to TFA, which you cannot remove. And the concentrations will be high.

Q: Where are MWRA biosolids land applied in MA?

A: Mostly being blended—so into other fertilizers and then land-applied. About 200 tons are sent to “agriculture,” but we don’t have a further breakdown.

Next meeting is THURSDAY November 20th at 10 am